

Craig Alan Stow

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Education

Ph.D. December 1992 - School of the Environment, Duke University, Durham, NC

Faculty Advisor: Dr. Kenneth H. Reckhow

Dissertation: The Effect of Errors-in-Variables on Parameter Estimation in a Lake Phosphorus Model.

M.S. May 1981 - Wetland Biogeochemistry Institute, Louisiana State University, Baton Rouge, LA Faculty Advisor: Dr. William H. Patrick, Jr. Major: Marine Sciences

Masters Thesis: Seasonal nutrient dynamics in a shallow sub-tropical hypereutrophic lake in south Louisiana.

B.S. May 1977 Cornell University, Ithaca, NY.

Major: Environmental Technology

Professional Experience

Senior Research Scientist, NOAA Great Lakes Environmental Research Laboratory Ann Arbor, MI. July 2006-present.

Associate Professor, University of South Carolina, Arnold School of Public Health, Department of Environmental Health Sciences, Columbia, SC. August 2003- June 2006.

Courses Taught – Applied Aquatic Sciences (Fall 03, 04, 05), Ecological Modeling and Environmental Planning (Spring 05, 06).

Visiting Assistant Professor, Aquatic Sciences, Duke University, Nicholas School of the Environment and Earth Sciences, Durham, NC. August 1996 – July 2003.

Courses Taught - Water Quality Management (Fall 96-02), Water Quality Field and Laboratory Skills (Spring 97-03), Seminar on “The Ecological Detective” by Hilborn and Mangel (Fall 98), Advanced Readings (Spring 01).

Teacher of the Year – 2002-03 academic year.

Teacher of the Year – 2001-02 academic year.

Administrative Responsibilities - Chair, Water and Air Resources Program, 1997-2003.

Post-Doctoral Researcher, University of Wisconsin, Center for Limnology, Madison, WI. July 1992 - August 1996.

Graduate Research and Teaching Assistant, Duke University, School of the Environment, Durham, NC. August 1986 - July 1992.

Environmental Program Specialist, Louisiana Department of Environmental Quality, Baton Rouge, LA. NPDES permit writer. February 1982 - July 1986.

Research Associate, Laboratory for Wetland Soils and Sediments, Louisiana State University, Baton Rouge, LA. November 1981 - January 1982.

Analytical Chemist, Analytical and Environmental Testing, Baton Rouge, LA. January 1981 – November 1981.

Graduate Research Assistant, Laboratory for Wetland Soils and Sediments, Louisiana State University, Baton Rouge, LA. August 1978 - December 1980.

Professional Memberships

American Association for the Advancement of Science, Ecological Society of America, Coastal, Estuarine Research Federation, International Association for Great Lakes Research

Publications

- 96) **Stow, C.A.**, Y. Cha, and S.S. Qian. A Bayesian hierarchical model to guide development and evaluation of substance objectives under the 2012 GLWQA. *Journal of Great Lakes Research*. In revision.
- 95) Filstrup, C.T., T. Wagner, P.A. Soranno, E.H. Stanley, **C.A. Stow**, K.E. Webster, and J.A. Downing. Regional variability in nonlinear chlorophyll-total phosphorus relationships in lakes. *Limnology & Oceanography*. In revision.
- 94) Cha, Y., S.S. Park, K. Kim, M. Byeon, **C.A. Stow**. Probabilistic prediction of cyanobacteria abundance in a Korean reservoir using a Bayesian Poisson regression. *Water Resources Research*. In press.
- 93) Zhang, H., D.M. Mason, **C.A. Stow**, A.T. Adamack, S.B. Brandt, X. Zhang, D.G. Kimmel, M.R. Roman, W.C. Boicourt, S.A. Ludsins. Impact of hypoxia on habitat quality of pelagic planktivorous fishes in the northern Gulf of Mexico. *Marine Ecology Progress Series*. In press.
- 92) Cha, Y. and **C.A. Stow**. A Bayesian network incorporating observation error to predict phosphorus and chlorophyll a in Saginaw Bay. *Environmental Modelling & Software*. In press.
- 91) Francoeur, S.N., K.A. Peters Winslow, D. Miller, **C.A. Stow**, Y. Cha, and S. Peacor. 2014. Spatial and temporal patterns in macroscopic benthic primary producers in Saginaw Bay, Lake Huron. *Journal of Great Lakes Research*. In press.
- 90) **Stow, C.A.**, J. Dyble, D. R. Kashian, T. H. Johengen, K. P. Winslow, S. D. Peacor, S. N. Francoeur, A. M. Burtner, D. Palladino, N. Morehead, D. Gossiaux, Y. Cha, S. S. Qian, D. Miller. Phosphorus Targets and Eutrophication Objectives in Saginaw Bay: A 35 Year Assessment. 2014. *Journal of Great Lakes Research*. In press.
- 89) Nash, K.L., C.R. Allen, D. G. Angeler, C. Barichievy, T. Eason, A. S. Garmestani, N.A. J. Graham, D. Granholm, M. Knutson, J. Nelson, M. Nyström, S. Riley, **C. A. Stow**, S.M. Sundstrom. 2014. Discontinuities, cross-scale dynamics, and ecosystem function. *Ecology*. In press.
- 88) Gronewold, A.D., and **C.A. Stow**. 2014. Water loss from the Great Lakes. *Science*, 343: 1084-1085.
- 87) Soranno, P.A., K. S. Cheruvilil, E.G. Bissell, M.T. Bremigan, J.A. Downing, C.E. Fergus, C.T. Filstrup, E.N. Henry, N.R. Lottig, E.H. Stanley, **C.A. Stow**, P.N. Tan, T. Wagner, K.E. Webster. 2014. Cross-scale interactions: quantifying multi-scaled cause-effect relationships in macrosystems. *Frontiers in Ecology and the Environment*, 12: 65-73.
- 86) Heffernan, J.B., P. Soranno, M. Angilletta, L.B. Buckley, W. Dodds, D.S. Gruner, T.H. Keitt, J.R. Kellner, J.S. Kominoski, A.V. Rocha, J. Xiao, T.K. Harms, S.J. Goring, L.E. Koenig, W.H. McDowell, H. Powell, A.D. Richardson, **C.A. Stow**, R. Vargas, K.C. Weathers. 2014. Macrosystems ecology: understanding ecological pattern and process at continental scales. *Frontiers in Ecology and the Environment*, 12: 5-14.

- 85) Gronewold, A.D., and **C.A. Stow**. 2014. Unprecedented seasonal water level dynamics on one of the Earth's largest lakes. *Bulletin of the American Meteorology Society*, 95: 15-17.
- 84) Madenjian, C.P., Rutherford, E.S. Rutherford, **C.A. Stow**, E.F. Roseman, and J.X. He. 2013. Trophic shift, not collapse. *Environmental Science & Technology*, 47: 11915-11916.
- 83) Gronewold, A.D., V. Fortin, B. Lofgren, A. Clites, **C.A. Stow**, F. Quinn. 2013. Coasts, water levels, and climate change: A Great Lakes perspective. *Climatic Change*, 120: 697-711.
- 82) **Stow, C.A.** and Y. Cha. 2013. Are chlorophyll *a* - total phosphorus correlations useful for modeling and inference? *Environmental Science & Technology*, 47: 3768-3773.
- 81) Gronewold, A.D., **C.A. Stow**, K. Vijayavel, M.A. Moynihan, and D.R. Kashian. 2013. Differentiating Enterococcus concentration spatial, temporal, and analytical variability in recreational waters. *Water Research*, 47: 2141-2152.
- 80) Cha, Y., **C.A. Stow**, E. Bernhardt. 2013. Dreissenid invasion impacts on chlorophyll and total phosphorus in 25 US lake ecosystems. *Freshwater Biology*, 58: 192-206.
- 79) Gronewold, A.D., **C.A. Stow**, J.L. Crooks, and T.S. Hunter. 2013. Quantifying parameter uncertainty and assessing the skill of exponential dispersion rainfall simulation models. *International Journal of Climatology*. 33: 746-757.
- 78) Kolasa, J., C.R. Allen, J. Sendzimir, and **C.A. Stow**. 2012 Predictions and retrodictions of the hierarchical representation of habitat in heterogeneous environments. *Ecological Modelling*, 245: 199-207.
- 77) Vanderploeg, H.A., S.A. Pothoven, G.L. Fahnenstiel, J.F. Cavaletto, J.R. Liebig, **C.A. Stow**, T.F. Nalepa, C.P. Madenjian, and D.B. Bunnell. 2012. Seasonal zooplankton dynamics in Lake Michigan: Disentangling impacts of resource limitation, ecosystem engineering, and predation during a critical ecosystem transition. *Journal of Great Lakes Research*, 38: 336-352.
- 76) Adamack, A.T., **C.A. Stow**, D.M. Mason, L.P. Rozas, and T.J. Minello. 2012. Predicting the effects of freshwater diversions on juvenile brown shrimp growth and production production: a Bayesian-based approach. *Marine Ecology Progress Series*, 444: 155-173.
- 75) Cha, Y., **C.A. Stow**, T.F. Nalepa, and K.H. Reckhow. 2011. Do invasive mussels restrict offshore phosphorus transport in Lake Huron? *Environmental Science & Technology*, 45: 7226-7231.
- 74) Gronewold, A.D., A.H. Clites, T.S. Hunter, and **C.A. Stow**. 2011. An appraisal of the Great Lakes advanced hydrological prediction system. *Journal of Great Lakes Research*, 37: 577-583.
- 73) Liu, Y., G.B. Arhonditsis, **C.A. Stow**, D. Scavia. 2011. Comparing Chesapeake Bay hypoxic-volume and dissolved-oxygen profile predictions with a Bayesian Streeter-Phelps model. *Journal of the American Water Resources Association*, 47:1348-1363.
- 72) Cha, Y., **C.A. Stow**, K.H. Reckhow, C. DeMarchi, and T. Johengen. 2010. Phosphorus load estimation in the Saginaw River, MI using a Bayesian hierarchical/multilevel model. *Water Research*, 44: 3270-3282.
- 71) Soranno, P.A., K.E. Webster, K. Spence Cheruvilil, M.T. Bremigan, T. Wagner, **C.A. Stow**. 2010. Using landscape limnology to classify freshwater ecosystems for multi-ecosystem management and conservation. *BioScience*, 60: 440-454.
- 70) Walker, J. T., **C.A. Stow**, and C. Geron. 2010. Nitrous oxide release from the Gulf of Mexico hypoxic zone. *Environmental Science & Technology*, 44: 1617-1623.

- 69) Lamon, E.C., and **C. A. Stow**. 2010. Lake Superior water level fluctuation and climatic factors: A dynamic linear model analysis. *Journal of Great Lakes Research*, 36: 172-178.
- 68) Lee, J-H, **C.A. Stow**, P.F. Landrum. 2009. Bayesian multilevel discrete interval hazard analysis to predict dichlorodiphenyldichloroethylene mortality in *Hyalella azteca* based on body residues. *Environmental Toxicology and Chemistry*, 28: 2458-2466.
- 67) Freeman, A.M., E.C. Lamon, and **C.A. Stow**. 2009. Nutrient criteria for lakes, ponds, and reservoirs: A Bayesian TREED model approach. *Ecological Modelling*, 220: 630-639.
- 66) **Stow, C.A.**, J. Jolliff, D. McGillicuddy, S. Doney, J.I. Allen, M. Friedrichs, K. Rose, and P. Wallhead. 2009. Skill assessment for coupled biological/physical models of marine systems. *Journal of Marine Systems*, 76: 4-15.
- 65) **Stow, C. A.** and D. Scavia. 2009. Modeling Hypoxia in the Chesapeake Bay: Ensemble estimation using a Bayesian hierarchical model. *Journal of Marine Systems*, 76: 244-250.
- 64) **Stow, C.A.**, E.C. Lamon, T. K. Kratz, and C. E. Sellinger. 2008. Lake level coherence supports common driver. *Eos*, 89: 389-390.
- 63) Richardson, C.J., R.S. King, S.S. Qian, P. Vaithianathan, R.G. Qualls, and **C.A. Stow**. 2008. Response to comment on "Estimating ecological thresholds for phosphorus in the Everglades". *Environmental Science & Technology*, 42: 6772-6773.
- 62) Sellinger, C.E., **C.A. Stow**, E C. Lamon, and S.S. Qian. 2008. Recent water level declines in the Lake Michigan-Huron system. *Environmental Science & Technology*, 42: 367-373. Cover article.
- 61) Richardson, C.J., R.S. King, S.S. Qian, P. Vaithianathan, R.G. Qualls, and **C.A. Stow**. 2007. Estimating ecological thresholds for phosphorus in the Everglades. *Environmental Science & Technology*, 41: 8084-8091. Cover article.
- 60) Arhonditsis, G.B., **C.A. Stow**, H.W. Paerl, L.M. Valdes-Weaver, L.J. Steinberg, and K.H. Reckhow. 2007. Delineation of the role of nutrient dynamics and hydrologic forcing on phytoplankton patterns along a freshwater-marine continuum. *Ecological Modelling*, 208: 230-246.
- 59) Arhonditsis, G.B., S.S. Qian, **C.A. Stow**, E.C. Lamon, and K.H. Reckhow. 2007. Eutrophication risk assessment using Bayesian calibration of process-based models: Application to a mesotrophic lake. *Ecological Modelling*, 208: 215-229.
- 58) **Stow, C.A.**, K.H. Reckhow, S.S. Qian, E.C. Lamon, G.B. Arhonditsis, M.E. Borsuk and D. Seo. 2007. Approaches to evaluate water quality model parameter uncertainty for adaptive TMDL implementation. *Journal of the American Water Resources Association*, 43: 1499-1507.
- 57) **Stow, C.A.**, C. R. Allen and A.S. Garmestani. 2007. Evaluating discontinuities in complex systems: Toward quantitative measures of resilience. *Ecology & Society*, 12: 26.
- 56) Arhonditsis, G.B., H.W. Paerl, L.M. Valdes-Weaver, **C.A. Stow**, L.J. Steinberg, and K.H. Reckhow. 2007. Application of Bayesian structural equation modeling for exploring phytoplankton dynamics in the Neuse River Estuary (North Carolina, USA). *Estuarine, Coastal, and Shelf Science*, 72: 63-80.
- 55) Arhonditsis, G.B., B.A. Adams-VanHarn, L. Nielsen, **C.A. Stow**, and K.H. Reckhow. 2006. Evaluation of the current state of mechanistic aquatic biogeochemical models: citation analysis and future perspectives. *Environmental Science & Technology*, 40: 6547-6554.
- 54) **Stow, C.A.**, K.H. Reckhow, and S.S. Qian. 2006. A Bayesian approach to retransformation bias in transformed regression. *Ecology*, 87: 1472-1477.

- 53) Allen, C.R., A. Garmestani, T. Havlicek, P. Marquet, G.D. Peterson, C. Restrepo, **C.A. Stow**, and B. Weeks. 2006. Patterns in body mass distributions: sifting among alternative hypotheses. *Ecology Letters*, 9: 630-643.
- 52) Garmestani, A.S., C.R. Allen, J.D. Mittelstaedt, **C.A. Stow**, and W.A. Ward. 2006. Firm diversity, functional richness and resilience. *Environment and Development Economics*, 11: 533-551.
- 51) Arhonditsis G.B., **C. A. Stow**, L.J. Steinberg, M.A. Kenney, S.J. McBride, K.H. Reckhow. 2006. Exploring ecological patterns with structural equation modeling and Bayesian analysis. *Ecological Modelling*, 192: 385-409.
- 50) Paerl, H.W., L. M. Valdes, M. F. Piehler, and **C. A. Stow**. 2006. Assessing the effects of nutrient management in an estuary experiencing climatic change: The Neuse River Estuary, NC, USA. *Environmental Management*, 37: 422-436.
- 49) **Stow, C. A.**, J. T. Walker, L. Cardoch, P. Spence, and C. Geron. 2005. Nitrous oxide emissions from streams in the Neuse River watershed, NC. *Environmental Science & Technology*, 39: 6999-7004.
- 48) Carle, M.V., P.N. Halpin, and **C. A. Stow**. 2005. Impacts of development pattern on water quality in urban streams. *Journal of the American Water Resources Association*, 41: 693-708.
- 47) Reckhow, K.H., G. Arhonditsis, M. Kenney, L. Hauser, J. Tribo, C. Wu, K. Elcock, L.J. Steinberg, **C.A. Stow**, S. McBride. 2005. A predictive approach to nutrient criteria. *Environmental Science & Technology*, 39: 2913-2919.
- 46) **Stow, C. A.**, S.S. Qian, and J.K. Craig. 2005. Declining threshold for hypoxia in the Gulf of Mexico. *Environmental Science & Technology*, 39: 716-723.
- 45) Lamon, E. C., and **C. A. Stow**. 2004. Bayesian methods for regional-scale lake eutrophication models. *Water Research*, 38: 2764-2774.
- 44) Borsuk, M. E., **C. A. Stow**, and K. H. Reckhow. 2004. A Bayesian network of eutrophication models for synthesis, prediction, and uncertainty analysis. *Ecological Modelling*, 173: 219-239.
- 43) Borsuk, M. E., **C. A. Stow**, and K. H. Reckhow. 2004. Confounding effect of flow on estuarine response to nitrogen loading. *Journal of Environmental Engineering*, 130: 605-614.
- 42) **Stow, C. A.**, E. C. Lamon, S. S. Qian, and C. A. Schrank. 2004. Will Lake Michigan lake trout meet the Great Lakes Strategy 2002 PCB reduction goal? *Environmental Science & Technology*, 38: 359-363.
- 41) **Stow, C. A.**, and M. E. Borsuk. 2003. Assessing TMDL effectiveness using flow-adjusted concentrations: A case study of the Neuse River, NC. *Environmental Science & Technology*, 37: 2043-2050.
- 40) **Stow, C. A.**, and M. E. Borsuk. 2003. Enhancing causal assessment of estuarine fishkills using graphical models. *Ecosystems*, 6: 11-19.
- 39) Borsuk, M. E., **C. A. Stow**, and K. H. Reckhow. 2003. An integrated approach to TMDL development for the Neuse River estuary using a Bayesian probability network model (Neu-BERN). *Journal of Water Resources Planning and Management*, 129: 271-282.
- 38) **Stow, C. A.**, C. Roessler, M. E. Borsuk, J. D. Bowen, and K. H. Reckhow. 2003. A comparison of estuarine water quality models for TMDL development in the Neuse River Estuary. *Journal of Water Resources Planning and Management*, 129: 307-314.

- 37) Qian, S. S., **C. A. Stow**, and M. E. Borsuk. 2003. On Monte Carlo methods for Bayesian inference. *Ecological Modelling*, 159: 269-277.
- 36) Borsuk, M. E., **C. A. Stow**, and K. H. Reckhow. 2002. Predicting the frequency of water quality standard violations: A probabilistic approach for TMDL development. *Environmental Science & Technology*, 36: 2109-2115.
- 35) **Stow, C. A.**, M. E. Borsuk, and K. H. Reckhow. 2002. Nitrogen TMDL development in the Neuse River watershed: An imperative for adaptive management. *Water Resources Update*, 122: 16-26.
- 34) Borsuk, M. E., D. Higdon, **C. A. Stow**, and K. H. Reckhow. 2001. A Bayesian hierarchical model to predict benthic oxygen demand from organic matter loading in estuaries and coastal zones. *Ecological Modelling*, 143: 165-181.
- 33) Jackson, L. J., S. R. Carpenter, J. Manchester, and **C. A. Stow**. 2001. PCB congeners in Lake Michigan coho (*Oncorhynchus kisutch*) and chinook (*O. tshawytscha*) salmon. *Environmental Science & Technology*, 35: 856-862.
- 32) Borsuk, M. E., **C. A. Stow**, R. A. Luettich, Jr., H. W. Paerl, and J. L. Pinckney. 2001. Modelling oxygen dynamics in an intermittently stratified estuary: Estimation of process rates using field data. *Estuarine, Coastal, and Shelf Science*, 52: 33-49.
- 31) **Stow, C. A.**, M. E. Borsuk, and D. W. Stanley. 2001. Long-term changes in watershed nutrient inputs and riverine exports in the Neuse River, North Carolina. *Water Research*, 35: 1489-1499.
- 30) Qian, S. S., Borsuk, M. E., and **C. A. Stow**. 2000. Seasonal and long-term nutrient trend decomposition along a spatial gradient in the Neuse River watershed. *Environmental Science & Technology*, 34: 4474-4482.
- 29) Lamon, E. C., S. R. Carpenter, and **C. A. Stow**. 2000. Depuration of PCBs in the Lake Michigan ecosystem. *Ecosystems*, 3: 332-342.
- 28) Borsuk, M. E., and **C. A. Stow**. 2000. Bayesian parameter estimation in a mixed-order model of BOD decay. *Water Research*, 34: 1830-1836.
- 27) Qian, S. S., M. Lavine, and **C. A. Stow**. 2000. Univariate Bayesian nonparametric binary response regression models with application in environmental management. *Environmental and Ecological Statistics*, 7: 77-91.
- 26) Lamon, E. C., and **C. A. Stow**. 1999. Sources of variability in microcontaminant data for Lake Michigan salmonids: Statistical models and implications for trend detection. *Canadian Journal of Fisheries and Aquatic Sciences*, 56, Supplement 1: 71-85.
- 25) Amrhein, J. F., **C. A. Stow**, and C. M. Wible. 1999. Whole-fish vs. filet PCB concentrations: An analysis using classification and regression tree (CART) models. *Environmental Toxicology and Chemistry*, 18: 1817-1823.
- 24) **Stow, C. A.** Assessing the relationship between *Pfiesteria* and estuarine fishkills. 1999. *Ecosystems*, 2: 237-241.
- 23) Lamon, E. C., S. R. Carpenter, and **C. A. Stow**. 1999. Rates of decrease of polychlorinated biphenyl concentrations in five species of Lake Michigan salmonids. *Canadian Journal of Fisheries and Aquatic Sciences*, 56: 53-59.
- 22) **Stow, C. A.**, L. J. Jackson, and S. R. Carpenter. 1999. A mixed-order model to assess contaminant declines. *Environmental Monitoring and Assessment*, 55: 435-444.

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- 20) Lamon, E. C., S. R. Carpenter, and **C. A. Stow**. 1998. Forecasting PCB concentrations in five species of Lake Michigan salmonids: A dynamic linear models approach. *Ecological Applications*, 8: 659-668.
- 19) Lathrop, R. C., S. R. Carpenter, **C. A. Stow**, P. A. Soranno, and J. C. Panuska. 1998. Phosphorus loading reductions needed to control blue-green algal blooms in Lake Mendota. *Canadian Journal of Fisheries and Aquatic Sciences*, 55: 1169-1178.
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- 16) Carpenter, S. R., D. Bolgrien, R. C. Lathrop, **C. A. Stow**, T. Reed, and M. A. Wilson. 1998. Ecological and economic analysis of lake eutrophication by nonpoint pollution. *Australian Journal of Ecology*, 23: 68-79.
- 15) Eby, L. A., **C. A. Stow**, R. J. Hesselberg, and J. F. Kitchell. 1997. Interactions of growth rates and diet in polychlorinated biphenyl (PCB) accumulation by Lake Michigan bloater (*Coregonus hoyi*). *Ecological Applications*, 7: 981-990.
- 14) **Stow, C. A.**, L. J. Jackson and J. F. Amrhein. 1997. An examination of the PCB:lipid relationship among individual fish. *Canadian Journal of Fisheries and Aquatic Sciences*, 54: 1031-1038.
- 13) **Stow, C. A.**, S. R. Carpenter, and R. C. Lathrop. 1997. A Bayesian observation error model to predict cyanobacterial biovolume from spring total phosphorus in Lake Mendota, Wisconsin. *Canadian Journal of Fisheries and Aquatic Sciences*, 54: 464-473.
- 12) Carpenter, S. R., L. J. Jackson, J. F. Kitchell, and **C. A. Stow**. 1996. That was then, but this is now - A reply to Gilbertson and Ludwig. *Ecological Applications*, 6: 971- 974.
- 11) **Stow, C. A.**, and K. H. Reckhow. 1996. Estimator bias in a lake phosphorus model with observation error. *Water Resources Research*, 32: 165-170.
- 10) **Stow, C. A.**, S. R. Carpenter, C. P. Madenjian, L. A. Eby, and L. J. Jackson. 1995. Fisheries management to reduce contaminant consumption. *BioScience*, 45: 752-758 and cover photo.
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- 8) **Stow, C. A.**, S. R. Carpenter, and K. L. Cottingham. 1995. Resource vs. ratio-dependent predator-prey models: A Bayesian perspective. *Ecology*, 6: 1986-1990.
- 7) **Stow, C. A.** 1995. Factors associated with PCB concentrations in Lake Michigan salmonids. *Environmental Science & Technology*, 29: 522-527.
- 6) **Stow, C. A.**, S. R. Carpenter, L. A. Eby, J. F. Amrhein, and R. J. Hesselberg. 1995. Evidence that PCBs are approaching stable concentrations in Lake Michigan fishes. *Ecological Applications*, 5: 248-260.
- 5) **Stow, C. A.**, S. R. Carpenter, and J. F. Amrhein. 1994. PCB concentration trends in Lake Michigan coho (*Oncorhynchus kisutch*) and chinook salmon (*O. tshawytscha*). *Canadian Journal of Fisheries and Aquatic Sciences*, 51: 1384-1390.

- 4) **Stow, C. A.**, and S. R. Carpenter. 1994. PCB accumulation in Lake Michigan coho and chinook salmon: Individual-based models using allometric relationships. *Environmental Science & Technology*, 28: 1543-1549.
- 3) Carpenter, S. R., K. L. Cottingham, and **C. A. Stow**. 1994. Fitting predator-prey models to time series with observation errors. *Ecology*, 75: 1254-1264.
- 2) Reckhow, K. H. and **C. A. Stow**. 1990. Monitoring design and data analysis for trend detection. *Lake and Reservoir Management*, 6: 49-60.
- 1) **Stow, C. A.**, R. D. Delaune, and W. H. Patrick. 1985. Nutrient fluxes in a eutrophic coastal freshwater lake. *Environmental Management*, 9: 243-252.

Book Chapters

- Cosens, B. and **C. A. Stow**. 2014. *Resilience and water governance: addressing fragmentation and uncertainty in water allocation and water quality law*. In: Social-Ecological Resilience and Law. Garmestani, A.S., and C.R. Allen, Eds. Columbia University Press. NY.
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- Stow, C.A.**, E.C. Lamon, S.S. Qian, P.A. Soranno, K.H. Reckhow. 2009. *Hierarchical/Multilevel Approaches for Inference and Prediction Using Cross-Sectional Lake Data*. In: *Real World Ecology: Large-Scale and Long-Term Case Studies and Methods*. Miao, S., S. Carstenn, and M. Nungesser, Eds. Springer, New York.
- Richardson, C.J., P. Vaithyanathan, R.G. Qualls, M. Bush, **C.A. Stow**, and M. Ho. 2008. *Water quality, soil chemistry and ecosystem responses to P dosing*. Chapter 15. In *The Everglades Experiments: Lessons for Ecosystem Restoration*. C.J. Richardson, Ed., Springer, New York.
- Richardson, C.J., R.S. King, S.S. Qian, P. Vaithyanathan, R.G. Qualls, and **C.A. Stow**. 2008. *An ecological basis for establishment of a phosphorus threshold for the Everglades ecosystem*. Chapter 25. In *The Everglades Experiments: Lessons for Ecosystem Restoration*. C.J. Richardson, Ed., Springer, New York.
- Stow, C.A.**, J. Sendzimir, and C. S. Holling. 2008. *Evaluating the textural discontinuity hypothesis: A case for adaptive inference*. Chapter 9. In *Discontinuities and Scale Breaks in Complex Systems*. C.R. Allen ed. Columbia University Press.
- Stow, C.A.**, M.E. Borsuk, and K.H. Reckhow. 2007. *Ecological risk assessment: The Neuse River Estuary, North Carolina*. Chapter 25: 563-585. In Robson, M.G., and W. A. Toscano eds. *Risk Assessment for Environmental Health*. Jossey-Bass/Wiley. San Francisco, CA.
- Sendzimir, J., C. R. Allen, L. Gunderson, and **C. Stow**. 2002. *Implications of body mass patterns: linking ecological structure and process to wildlife conservation and management*. Pages 125-152 in, Bissonette, J. and I. Storch, eds. *Landscape ecology and resource management: linking theory with practice*. Island Press, Washington, DC.

Book Reviews

- Stow, C. A.** 2009. Larry J. Wymer. 2007. *Statistical Framework for Recreational Water Quality Criteria and Monitoring*. John Wiley & Sons, Ltd. West Sussex. *Journal of the American Statistical Association*, 104: 867.

- Stow, C. A.** 2004. Charles D. Canham, Jonathan J. Cole, and William K. Lauenroth, editors. 2003. *Models in Ecosystem Science*. Princeton University Press. Princeton. *The Quarterly Review of Biology*, 79: 330-331.
- Stow, C. A.** 2002. Bryan F. J. Manly. 2002. *Statistics for Environmental Science and Management*. Chapman & Hall/CRC. New York, NY. *Risk Analysis*, 22: 183.
- Stow, C. A.** and J. J. Magnuson. 1996. Frank H. Rigler and Robert H. Peters. 1995. *Science and Limnology*. Excellence in Ecology 6. Ecology Institute, Nordbunte 23, D-21385 Oldendorf/Luhe Germany. *Ecology*, 77: 1646.

Conference Proceedings

- Reckhow, K. H., M. E. Borsuk, and **C. A. Stow**. 2003. Probabilistic risk assessment for Total Maximum Daily Surface-Water Loads (TMDLs). Proceedings of the International Workshop on Uncertainty, Sensitivity, and Parameter Estimation for Multimedia Environmental Modeling. Rockville, MD.
- Reckhow, K. H., **C. A. Stow**, and M. E. Borsuk. 2002. Uncertainty between the criterion and designated use: Implications for standards and TMDL margin of safety. Water Environment Federation, National TMDL Science and Policy Conference. Phoenix. AZ.
- Reckhow, K. H., M. E. Borsuk, and **C. A. Stow**. 2002. Adaptive implementation of TMDLs using Bayesian analysis. Water Environment Federation, National TMDL Science and Policy Conference. Phoenix. AZ.
- Borsuk, M. E., **C. A. Stow**, and K. H. Reckhow. 2002. Integrative environmental prediction using Bayesian networks: A synthesis of models describing estuarine eutrophication. *IEMSS Conference proceedings*, Lugano, Switzerland
- Borsuk, M., **C. Stow**, and K. Reckhow. 2001. A probability network model for TMDL development in the Neuse River watershed. In J.J. Warwick (Editor), AWRA Annual Spring Specialty Conference Proceedings, American Water Resources Association, Middleburg, Virginia, pp. 127-131.
- Reckhow, K. H. and **C. A. Stow**. 1993. Ecological impacts of excess nutrients in the environment: issues, management, and decision making. Proceedings, Symposium on the Economics of Nutrient Management Policy, pp. 5-19. Southern Regional Information Exchange Group Meeting of Natural Resource Economists. Raleigh, NC.

Technical Reports

- Stow, C.**, T. Hook, editors. 2013. Saginaw Bay Multiple Stressors Summary Report. NOAA GLERL Technical Memorandum TM-160.
- Shabman, L., K. Reckhow, M.B. Beck, J. Benaman, S. Chapra, P. Freedman, M. Nellor, J. Rudek, D. Schwer, T. Stiles, and **C. Stow**. 2007. Adaptive implementation of water quality improvement plans: opportunities and challenges. Nicholas School of the Environment and Earth Sciences Publication #.
- Reckhow, K.H., G.B. Arhonditsis, M.A. Kenney, S.J. McBride, R.J. Gosnell, **C.A. Stow**, and H.W. Paerl. 2006. Water Quality Indicators: Nutrient Impacts on Chlorophyll or Algae Species Composition. Report 02-ECO-1, Water Environment Research Federation.

- Cottingham, P., S. Carpenter, R. Hilborn, J. Kitchell, and **C. Stow**. 2001. Large-scale ecological studies and their importance for freshwater resource management. Cooperative Research Centre for Freshwater Ecology. Technical Report No. 4/2001. University of Canberra.
- Stow, C. A.**, J. W. Wintergreen, and R. C. Cason. 2001. Sedimentation and water quality in Lake Jeanette, Greensboro, NC. Water Resources Research Institute, Raleigh, NC.
- Stow, C. A.**, and M. E. Borsuk. 2000. An examination of long-term nutrient data in the Neuse River watershed. Report No. 325-E. Water Resources Research Institute, Raleigh, NC.
- Richardson, C. J., P. Vaithyanathan, R. G. Qualls, and **C. Stow**. 1997. Dosing study chemistry analysis: Four-year response (1992-1996) of Everglades sloughs to increased concentrations of PO₄: Operation of experimental field mesocosms and water quality analysis, in Effects of Phosphorus and Hydroperiod Alterations on Ecosystem Structure and Function in the Everglades. Duke Wetland Center publication 97-05. Nicholas School of the Environment, Duke University, Durham, NC.
- Reckhow, K. H., **C. A. Stow**, J. Mitchell, and N. Denisov. 1989. Design of the Triangle Area Water Supply Monitoring Program. Triangle J Council of Governments. Research Triangle Park, NC.

Manuscripts in Prep/Review

- DuFour, M.R., J. J. Pritt, C. M. Mayer, **C.A. Stow**, S.S. Qian. Bayesian hierarchical modeling of larval fish abundance and mortality: accounting for temporal and spatial variability of walleye (*Sander vitreus*) in a large river. *Journal of Great Lakes Research*.
- Qian, S.S., **C.A. Stow**, Y. Cha, and L.L. Yuan. Statistical considerations in assessing the compliance of water quality criteria. *Environmental Science & Technology*.
- Lottig, N.R., T. Wagner, K. S. Cheruvilil, J. A. Downing, E. N. Henry, **C. A. Stow**, and K. E. Webster. Long-term trends and patterns in citizen monitoring secchi data. *PLoS One*.

Conference Presentations

- Spatial and temporal patterns in Saginaw Bay water quality. International Association for Great Lakes Research. June 2013. West Lafayette, IN.
- Science to management: Experiences in the Great Lakes. American Society for Limnology and Oceanography. February 2013. New Orleans, LA.
- Rapid summertime oxygen depletion in Saginaw Bay. International Association for Great Lakes Research. May 2012. Cornwall, Ontario.
- Managing multiple stressors: the saga of Saginaw Bay. Coastal and Estuarine Research Federation. November 2011. Daytona Beach, FL.
- Dreissenid mussel influences on phosphorus export from Saginaw Bay to Lake Huron. International Association for Great Lakes Research. May 2011. Duluth, MN.
- Tropical storm influence on nitrous oxide emissions from the Gulf of Mexico hypoxic zone. Ecological Society of America. August 2010. Pittsburgh, PA.
- Evaluating and forecasting Lake Superior water level fluctuations using dynamic linear models. International Association for Great Lakes Research. May 2010. Toronto, ON.
- Insights into the benthic algal community in Saginaw Bay, Lake Huron. State of Lake Michigan Conference. September 2009. Milwaukee, WI.

The Saginaw Bay Multiple Stressors Project. International Association for Great Lakes Research. May 2009. Toledo, OH.

The rise and fall of the Great Lakes water levels. EPA SWIMS Conference. February 2009. Chicago, IL.

The ups and downs of Great Lakes water levels. EPA Tribal Climate Change Conference. December 2008. Milwaukee, WI.

Analysis of water level changes in lakes Michigan and Huron. International Association for Great Lakes Research. May 2008. Peterborough, Ontario.

Bayesian ensemble estimation in a Chesapeake Bay hypoxia model. Estuarine Research Federation. November 2007. Providence, RI.

The confounding effect of river discharge on estuarine response to nutrient loading. Ecological Impacts of Hypoxia on Living Resources. March 2007. Bay St. Louis, MS.

Modeling hypoxia in the Chesapeake Bay: Ensemble estimation using a Bayesian hierarchical model. Skill Assessment for Coupled Biological/Physical Models of Marine Systems. March 2007. Chapel Hill, NC.

Bayesian hierarchical/multi-level modeling approaches for large-scale ecological inference. Ecological Society of America. Memphis, TN. August 2006. Invited presentation.

Hypoxia: A declining threshold. Ecological Society of America. Montreal, Quebec, CA. August 2005.

A probability network of eutrophication models for the Neuse River estuary. Ecological Society of America. Savannah, Georgia. August 2003.

Nitrogen TMDL development for the Neuse River, North Carolina. American Water Resources Association. Snowbird, Utah. June 2001.

Nutrient reduction in the Neuse River watershed: A case for adaptive management. North Carolina Water Resources Research Conference. Raleigh, NC. March 2001.

Is classical inference an appropriate framework to evaluate the textural discontinuity hypothesis? International Association of Landscape Ecology. Ft. Lauderdale, Florida. April 2000.

Recent historical nutrient loading in the Neuse River. North Carolina Water Resources Research Conference. Raleigh, NC. March 1999.

Recent historical nutrient changes in the Neuse River Estuary, North Carolina. American Society of Limnology and Oceanography/Ecological Society of America. St. Louis, Missouri. June 1998.

Does lipid concentration determine contaminant levels in Lake Michigan fishes? International Association for Great Lakes Research. Toronto, Ontario. May 1996.

Herring gull eggs indicate stabilizing Great Lakes PCB concentrations. Society of Environmental Toxicology and Chemistry. Vancouver, British Columbia. November 1995.

Empirical relationships to estimate the probability of summer blue-green algae blooms from spring total phosphorus levels. Ecological Society of America. Snowbird, Utah. August 1995.

Reducing human contaminant exposure from Lake Michigan fish consumption: Can Fisheries Management Play a Role? International Association for Great Lakes Research. East Lansing, MI. June 1995.

Do PCB concentration trends in Lake Michigan fishes reflect local or global patterns? Society of Environmental Toxicology and Chemistry. Denver, CO. October 1994.

PCB concentration trends in Lake Michigan fishes. American Fisheries Society. Halifax, Nova Scotia. August 1994.

Will PCB concentrations in Lake Michigan fishes undergo further declines? International Association for Great Lakes Research. Windsor, Ontario. June 1994.

Exploration of the variability of PCB accumulation in Lake Michigan salmon, using individual-based models. Ecological Society of America. Madison, WI. August 1993.

Comparisons of PCB Accumulation Dynamics in Great Lakes Salmonids. International Association for Great Lakes Research. Green Bay, WI. June 1993.

The Use of Individual Based Models to Investigate PCB Dynamics in Lake Michigan. Wisconsin Chapter of the American Fisheries Society. Stevens Point, WI. January 1993.

The Effect of Errors-in-Variables on Parameter Estimation and Prediction Uncertainty in a Lake Phosphorus Model. 3rd International Environmetrics Conference, Madison, WI. October 1991.

Sessions Chaired

The Impacts of Environmental Stressors on the Saginaw Bay Ecosystem. International Association for Great Lakes Research. June 2013. With N. Hawley, C. Roswell, and T. Hook. West Lafayette, IN.

Managing Multiple Stressors in Coastal Ecosystems. Coastal and Estuarine Research Federation. November 2011. With E. Turner, L. Pugh, and M. Dowgiallo. Daytona Beach, FL.

Recent Impacts of Invasive Species on the Great Lakes Ecosystem. International Association for Great Lakes Research. With G. Fahnensteil and H. Vanderploeg. Duluth, MN.

The Continuing Impact of Multiple Stressors on Saginaw Bay. International Association for Great Lakes Research. with J. Bressie and J. DePinto. May 2009. Toledo, OH.

Pattern and Process in Material Cycling in Large Lakes. International Association for Great Lakes Research. with L. J. Jackson and D. Haffner. June 1997. Buffalo, NY.

Professional Activities

Great Lakes Water Quality Agreement Annex 2 Lake Ecosystems Objectives Task Team, 2014 – present.

Great Lakes Water Quality Agreement Annex 4 Subcommittee, 2013 – present.

International Joint Commission. Lake Erie Ecosystem Priority Science Synthesis Workshop 2012. Windsor, Ontario.

Editorial Board –Ecosystems, March 2012 – present.

Editorial Board – Advances in Water Resources, March 2012 – present.

Managing for Resilience. Working Group. John Wesley Powell Center for Earth System Science Analysis and Synthesis. 2012-2013. Ft. Collins, CO.

International Joint Commission Workshop on Great Lakes Eutrophication. February 17-18, 2009. Windsor, Ontario.

Ecological Impacts of Hypoxia on Living Resources. March 26-29, 2007. Bay St. Louis, MS.

Skill Assessment for Coupled Biological/Physical Models of Marine Systems. March 6-8, 2007. Chapel Hill, NC.

Workshop on Resilience and Discontinuities in Complex Systems. October 15-21, 2006. Stockholm, Sweden.

Hypoxia in the Gulf of Mexico, Assessing the State of the Science. Invited Panelist. April 25-28, 2006. New Orleans, LA.

USEPA Oceanography and Coastal Processes STAR Fellowship Review Panel. March 13-14, 2006. Washington, DC.

USEPA Aquatic Systems Ecology STAR Fellowship Review Panel. March 8-9, 2006. Washington, D.C.

Advances in Macroecological Methods – The Analysis of Body Mass Patterns and Their Landscape Ecological Relevance. Umea, Sweden. October 27-29, 2005.

National Science Foundation National Dissemination Workshop. New Approaches and Techniques for Teaching Science: Addressing Environmental Problems to Stimulate Undergraduate Learning. Rochester Institute of Technology. Rochester, NY. July 29-August 2, 2005.

Adaptive Implementation of TMDLs: Interpretation and Applications. Working Group. October, 2004 October, 2006. Duke University, Durham, NC.

Water Quality Program Review. USEPA National Exposure Research Laboratory. August 31-September 2, 2004. Cincinnati, Ohio.

Environmental Health Conference. Environmental and Occupational Health Council of the Association of Schools of Public Health. July 11-13, 2004. Minneapolis, MN.

USEPA Aquatic Systems Ecology STAR Fellowship Review Panel. February 19-20, 2004. Washington, DC.

Textural Discontinuity Hypothesis Workshop. Cedar Key, FL. December 11-12, 2003.

Southeastern NEON Planning Workshop. Savannah River Ecology Laboratory Conference Center, Aiken, SC. October 2003.

National Drinking Water Advisory Council Contaminant Candidate List Classification Process Work Group. 2002-03.

Identifying, Tracking and Understanding the Impacts of Fecal Contamination in North Carolina Coastal Waters. North Carolina National Estuarine Research Reserve. Beaufort, NC. September 2002.

Instructor. Duke University Center for Environmental Education. Environmental Science Institute for High School Science Teachers. July 2002.

University of North Carolina Water Resources Research Institute Technical Advisory Committee. July 1, 2001 – June 30, 2003.

Tar-Pamlico Basin Oversight Committee. Academic Representative. Fall 2001-2002.

Workshop on Development of Site-Specific Nutrient Water Quality Criteria. Water Environment Research Foundation/Cadmus Group. June 18-19, 2001. Durham, NC.

Environmental Protection Agency Gulf of Mexico Estuarine Indicators Review Panel. June 7-8, 2001. Washington, D. C.

Workshop on Ecological/Institutional Interactions in the Rapidly Developing Mid-Atlantic Piedmont Region. April 19-20, 2001. Amicalola Falls, GA.

Workshop on Ecological Organization. National Center for Ecological Analysis and Synthesis. March 1-4, 2001. Santa Barbara, CA.

Research Problems in Freshwater Ecosystems. Cooperative Research Centre for Freshwater Ecology. Invited speaker. December 11-15, 2000. Monash University. Melbourne, Australia.

Environmental Protection Agency National Aquatic Ecosystem Classification and Reference Conditions Review Panel. July 27-28, 2000. Washington, D. C.

Workshop on Ecological Organization. National Center for Ecological Analysis and Synthesis. Santa Barbara, CA. June 9-13, 2000

National Science Foundation/Environmental Protection Agency Water and Watersheds Review Panel. August 23-25, 1999. Washington, D. C.

Scale Breaks in Organized Systems Workshop. Sponsored by the Resilience Network. Cedar Key, FL. February 18-20, 1999.

Neuse River Modeling and Monitoring. Sponsored by the NC Water Resources Research Institute. Raleigh, NC. November 12, 1997.

Workshop on Yellow Perch Dynamics. Sponsored by the Cornell Biological Field Station. May 3-4 1997.

PCBs, the New Equilibrium? Workshop of the Great Lakes Science Advisory Board's Workgroup on Parties Implementation. Sponsored by the International Joint Commission. September 10, 1996. Windsor, Ontario.

Ecological Resource Monitoring: Change and Trend Detection. Invited speaker. Sponsored by the American Statistical Association, the Ecological Society of America and the Environmental Protection Agency. May 1-3 1996. Laurel, Maryland.

National Science Foundation/Environmental Protection Agency Water and Watersheds Review Panel. July 15-17 1996. Washington, D. C.

Manuscript and Grant Reviews

Agriculture, Ecosystems & Environment, Biology Letters, Biometrics, Canadian Journal of Fisheries and Aquatic Sciences, Conservation Ecology, Ecological Applications, Ecology, Ecosystems, Environmental Engineering Science, Environmental Management, Environmental Monitoring and Assessment, Environmental Science & Technology, Environmental Technology, Environmental Toxicology and Chemistry, Estuaries, Global Biogeochemical Cycles Frontiers of Environmental Science and Engineering in China, Hudson River Foundation, Human and Ecological Risk Assessment, Journal of Agricultural and Food Chemistry, Journal of Environmental Engineering, Journal of Environmental Management, Journal of Environmental Quality, Journal of Great Lakes Research, Journal of the American Water Resources Association, Journal of Marine Systems, Journal of Stochastic Environmental Research and Risk Analysis, Lake and Reservoir Management, Limnology & Oceanography, Marine and Freshwater Research, National Science Foundation, NC Sea Grant, NC Water Resources Research Institute, National Oceanic and Atmospheric Administration, Oecologia, Proceedings

of the National Academy of Science, Regulatory Toxicology and Pharmacology, Risk Analysis, San Francisco Estuary & Watershed Science, Sigma Delta Epsilon-Graduate Women in Science, Stochastic Environmental Research and Risk Assessment, Transactions of the American Fisheries Society, Tree Physiology, US Environmental Protection Agency, USGS Maine Water Resources Institute, Water Management, Water Research, Wetlands, Wetlands Ecology and Management.

Grants

Adaptive Integrated Framework (AIF): a new methodology for managing impacts of multiple stressors in coastal ecosystems, NOAA Center for Sponsored Coastal Ocean Research, \$3,760,000, with 20 co-PIs.

Water Quality Indicators: Nutrient Impacts on Chlorophyll or Algae Species Composition, Water Environment Research Foundation, \$250,000, with K.H. Reckhow, S. McBride, C.J. Richardson, R.G. Wetzel, H. Paerl, R. Gosnell.

Adaptive Implementation and Monitoring Plan for TMDL Refinement, US EPA, \$660,171, with K.H. Reckhow, L.A. Shabman, C. Roessler, G. McMahon, M.E. Borsuk.

Bayesian Methods for Regional Scale Stressor Response Models, US EPA, \$381,396, with E.C. Lamont. Development of fecal coliform TMDLs using Bayesian modeling and novel molecular monitoring techniques, US EPA, \$560,000, with K.H. Reckhow, N. White, R. Nobel.

Comparative Analysis and SPARROW Watershed Modeling of Charlotte's Stormwater Monitoring Network. City of Charlotte, NC Stormwater Services Department. \$23,688, with J. Bowen.

Interrelationships of Water Quality Characteristics in the Neuse River Basin North Carolina Water Resources Institute. \$8,831.

An Erosion and sedimentation study of Lake Jeanette and the Lake Jeanette Watershed, Greensboro, NC. North Carolina Water Resources Institute. \$39,765.

Analysis of ambient monitoring data in the Neuse River basin. North Carolina Water Resources Institute. \$17,754.